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March 16, 2023 10:00 am - 12:00  
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10:00

Welcome and Introductions

Miki Kato

Program Director, [MIT Industrial Liaison Program](#)



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Program Director

[MIT Industrial Liaison Program](#)

Miki Kato joined the MIT Industrial Liaison Program as a Program Director in October 2021. Mr. Kato has over 20 years of experience in new business development, including various activities with MIT.

Prior to joining the ILP, Kato worked at FUJIFILM Corporation for 40 years in various new business development sectors. He was President of FUJIFILM Pharmaceuticals U.S.A., Inc., conducting the clinical trials of FUJIFILM pipeline drugs and leading the joint research project in drug delivery with MIT's Koch Institute. During his tenure, he also collaborated with the Department of Electrical Engineering at MIT for digital camera's CMOS image sensors and the Department of Materials Sciences and Engineering for high-speed photodetectors.

Kato has presented at several conferences at the Cambridge Innovation Center, including the 2018 Japan Innovation Forum with the Consulate General of Japan and the 60th-anniversary Kyoto-Boston sister city celebration Life Science Forum (2019) with the City of Boston, the Japan Society of Boston, and the Consulate General of Japan.

He holds an M.E. in Polymer Chemistry from Kyoto University and an M.S. in Management of Technology from MIT.

10:03 AM

## Optimizing Plant-Environment Interactions as an Opportunity to Ensure Food Security and Ecological Resilience

David L. Des Marais

Cecil & Ida Green Career Development Professor,  
Assistant Professor, [MIT Civil and Environmental Engineering](#)



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Assistant Professor  
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David L. Des Marais (PI) is Cecil & Ida Green Career Development Professor and Assistant Professor of Civil and Environmental Engineering of Civil and Environmental Engineering working at the interface of genomics, ecophysiology, and quantitative genetics. He received his BA at UC Berkeley and Ph.D. at Duke University, both in biology, before completing a USDA-funded post-doc at the University of Texas at Austin. Professor Des Marais joined MIT after an appointment as a research associate at Harvard University.

The Des Marais Lab is generally interested in how plants perceive, integrate, and respond to complex environmental cues at the cellular and whole-plant scale. Specific topics of interest include the regulatory control of stress response, biomass allocation in fluctuating environments, and the interaction between abiotic and biotic stressors in natural ecological systems.

Solar energy captured by plants is the central currency of life on Earth. Through a set of elegant chemical reactions, plants use solar energy to power the conversion of atmospheric CO<sub>2</sub> into stable sugars. These organic compounds, in turn, are used by the plant for growth and seed production, which represent all of the human nutrition. Understanding how three fundamental plant processes – growth, metabolism, and reproduction -- are controlled by genes and the environment is a fundamental challenge for plant science as we work to ensure the resilience of ecological and agricultural systems. The Des Marais Group at MIT studies the mechanisms of plant-environment interactions in order to predict plant responses to climate change and to identify possible targets for crop improvement. Professor David L. Des Marais will present the case that plant sciences have the necessary tools to ensure food security but lack the necessary fundamental understanding of plant physiology to develop next-generation crops and cropping systems. He will highlight opportunities for partnerships between researchers in the academic and private sectors to leverage big data, computational biology, and genome editing to maximize plant productivity in our changing world.

10:32 AM

Photonics for Resilient Agriculture

Rajeev Ram

Professor of Electrical Engineering, Electrical Engineering and Computer Science (EECS)



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Professor of Electrical Engineering, Electrical Engineering and Computer Science (EECS)

Rajeev J. Ram has worked in the areas of physical optics and electronics for much of his career. In the early 1990's, he developed the III-V wafer bonding technology that led to record brightness light emitting devices at Hewlett-Packard Laboratory in Palo Alto. While at HP Labs, he worked on the first commercial deployment of surface emitting lasers. In the early 1990's, he developed the first semiconductor laser without population inversion, semiconductor lasers that employ condensation of massive particles, and threshold-less lasers.

Since 1997, Ram has been on the Electrical Engineering faculty at the Massachusetts Institute of Technology (MIT) and a member of the Research Laboratory of Electronics. He has served on the Defense Sciences Research Council advising DARPA on new areas for investment and served as a Program Director at the newly founded Advanced Research Project Agency-Energy. At ARPA-E, he managed a research portfolio exceeding \$100M and consulted with the Office of Science and Technology Policy and the White House.

His group at MIT has developed record energy-efficient photonics for microprocessor systems, microfluidic systems for the control of cellular metabolism, and the first light-source with greater than 100% electrical-to-optical conversion efficiency. His group's work on small-scale solar thermoelectric generation is being deployed for rural electrification in the developing world as SolSource and was recognized with the St. Andrews Prize for Energy and the Environment.

Ram holds degrees in Applied Physics from California Institute of Technology and Electrical Engineering from the University of California, Santa Barbara.

[View full bio](#)

Innovative approaches are urgently required to alleviate the growing pressure on agriculture to meet the global demand for food. Climate change accelerates the need to develop resilient plant cultivars and adaptive management practices. This presentation introduces and describes photonic tools to rapidly and non-invasively detect biotic and abiotic stresses developed through a collaborative partnership between MIT and the Temasek Life Sciences Laboratory (TLL) in Singapore. The recently launched MIT Climate Grand Challenge program supports the development of photonic technology for the optimization of microbiomes to support crops that remain productive under climate stresses.

Abdul Latif Jameel Professor of Water and Food  
Director, Abdul Latif Jameel World Water and Food Security Lab  
Director, Center for Clean Water and Clean Energy  
MIT Department of Mechanical Engineering



John Lienhard

Abdul Latif Jameel Professor of Water and Food  
Director, Abdul Latif Jameel World Water and Food Security Lab  
Director, Center for Clean Water and Clean Energy  
MIT Department of Mechanical Engineering

John H. Lienhard V is the Abdul Latif Jameel Professor of Water and Food and the Director of the Abdul Latif Jameel World Water and Food Security Lab at MIT. During more than 26 years on the MIT faculty, Lienhard's research and educational efforts have focused on water purification and desalination, heat and fluid flow, and experimentation. He has also filled a number of administrative roles at MIT. Lienhard received his bachelors and masters degrees in thermal engineering at UCLA from the Chemical, Nuclear, and Thermal Engineering Department. He joined MIT immediately after completing his PhD in the Applied Mechanics and Engineering Science Department at UC San Diego. Lienhard's research on water purification includes humidification-dehumidification desalination, membrane distillation desalination, osmotic processes, solar-driven desalination, scale formation, electrodialysis, management of high salinity brines, thermodynamic and energy efficiency analysis of desalination cycles, and energy-water nexus issues. Lienhard has directly supervised more than 70 graduate theses and postdoctoral associates.

Lienhard is a recipient of the 1988 National Science Foundation Presidential Young Investigator Award, the 1992 SAE Teetor Award, a 1997 R&D 100 Award, the 2012 ASME Technical Communities Globalization Medal, and is a Fellow of the American Society of Mechanical Engineers. Lienhard and his students have received three best paper awards at water and desalination conferences during the past 3 years. He holds more than a dozen US Patents, many of which have been commercialized in the water industry. Lienhard is the co-author of textbooks on heat transfer and on measurement and instrumentation. His heat transfer book has been available online at no charge since 2002, and more than 300,000 copies have been downloaded ([ahtt.mit.edu](http://ahtt.mit.edu)). His measurements book has sold more than 100,000 copies. He has created new courses on desalination, on thermal modeling, and on compressible fluid mechanics. He has also received several awards at MIT for his teaching. In addition, Lienhard has directed the Center for Clean Water and Clean Energy at MIT and KFUPM since it was founded in 2008.

[View full bio](#)

11:08 AM

MIT Startup Exchange Startups Working in AgTech  
Yui Yashiro  
Program Director, [MIT Industrial Liaison Program](#)



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Program Director  
[MIT Industrial Liaison Program](#)

Before joining MIT Corporate Relations in 2022, Yui Yashiro was Senior Manager, Commercial Insights & Salesforce Operations at Alexion Pharmaceuticals in Boston. As Manager, Commercial Strategy & Operations, she was responsible for reaching group sales targets and leading cultural change projects, including DEI initiatives. Before Alexion, Yashiro was Senior Planning Analyst, Corporate Planning for TeraDiode Inc. (a Panasonic company) in Wilmington, MA, where she led business planning activities. Additionally, she held two roles at Takeda in Tokyo and Osaka. As Chief of Cardiovascular & Metabolic, Shonan Office, Japan Pharma Business Unit, Yashiro was a leader in sales and sales strategy, consistently achieving & surpassing revenue and market share targets for herself and the sales team that she led.

Yashiro earned her B.A. Education & Human Science at Tsukuba University and her MBA at Ohmae Kenichi Graduate School of Business, both in Japan.

11:13 AM

Engineering Programmable Microbes for Crop Protection

Louis Papa  
Strain Engineer  
[Robigo](#)

Facing a changing climate and increasing disease pressure, growers spend nearly \$80B on six billion pounds of pesticides each year and yet still experience yield losses of 20-40% due to pests and disease. Broad-acting, chemically derived pesticides - currently the industry standard - are losing both efficacy and public support as resistance spreads and their negative environmental impacts become clear. At Robigo, we've developed a scalable plug-and-play platform technology that leverages cutting-edge biotechnology, CRISPR, and data science to empower microbes to protect crops, fight disease, and improve overall yields. Robigo is unlocking the potential of engineered microbes in agriculture to fundamentally change how the world grows food and create a more sustainable future. Founded by MIT synthetic biologists, Robigo is a VC-backed, seed stage biotech startup based in Cambridge, MA.

11:28 AM

Optimizing Crop Production and Operations in Controlled Environment Agriculture with AI Technology

Ian Seiferling  
CEO & Co-Founder  
[Adaviv](#)

Adaviv is revolutionizing the Controlled Environment Agriculture (CEA) industry by bringing automation and plant-level insights to the field. Adaviv's AI-powered technology spun off from MIT, acts as the "eyes and brains" of the best growers, optimizing crop production and operations to improve plant health and crop quality, enhance standard operating procedures (SOPs), and optimize labor, ultimately driving higher revenue and wider margins. Adopting technology to automate manual tasks, collect accurate data, and establish plant-centric SOPs can help cultivators minimize costs, improve product quality, and make their processes scalable and repeatable. Adaviv's partners have seen significant results such as winning awards, saving crops from pests and disease, and boosting yields by 21-41% (up to 230% in some cases) while also saving 20%+ on labor and input costs. The right technology can set cultivators on a path towards profitability and success in the CEA industry.

11:43 AM

## Decarbonizing the Future of Consumer Goods Through Next-Generation Oils and Fats

David Heller  
Co-Founder and Head of Operations  
[C16 Biosciences](#)

Oils and fats are the backbone of ingredients found ubiquitously in consumer products, in everything from soaps and shampoos to lipstick, Nutella, and biodiesel, to name a few. The current market for oils and fats is \$250 billion, and it is projected to grow to \$875 billion by 2050, driven by global population growth. Current sources of fats and oils are unpredictable and unsustainable, leaving consumer goods manufacturers with few good options. C16 Biosciences' proprietary biomanufacturing platform unlocks the scaled production of novel oils that can outperform existing alternatives – starting with palm oil - meeting the cost, performance, and sustainability requirements for consumer products.

12:00 PM

Adjournment